

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the future action for the Ranges Near Training Area T-24A site. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071 *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to the Ranges Near Training Area T-24A is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples, and the procedures necessary to meet the objectives of the supplemental RI and establish a basis for future action at this site.

The supplemental RI water and soil matrix samples will be analyzed using EPA SW-846 Methods, including Update III methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using Contract Laboratory Program (CLP)-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The intended data users and available data related to the supplemental RI SFSP at the Ranges Near Training Area T-24A, presented in Table 3-1, have been used to formulate a site-specific conceptual model. Analytical data collected during SI activities at Parcels 88(6) and 108(7) will be included in the conceptual model. This conceptual model was developed to support the development of this supplemental RI SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The data users for information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This supplemental RI SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide defensible information required to confirm or deny the existence and nature of residual chemical contamination in site media.

Table 3-1

Summary of Data Quality Objectives
Ranges near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Potential Data Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity	
EPA ADEM USACE DOD IT Corporation Other Contractors Possible future land users	SAIC, Site Investigation Report, 1993	<u>Contaminant Source</u> Decontaminating agents used on CWA. Toxic agents and munitions	Surface Soil	Obtain sufficient data to support, as appropriate, the following: - Implementing an immediate response. - No further action. - Proceeding with an remedial action. RI to determine the nature and extent of contamination in the site media.	<u>Surface Soil</u>	Definitive data in CESAS Level B data packages	29 surface soil samples +QC	
			Subsurface Soil		TCL-SVOCs Metals Explosives		14 existing from SIs at 108(7) and 88(6), IT, 1999	
	SAIC, Remedial Investigation Report, 1995	<u>Migration Pathways</u> Infiltration and leaching to subsurface soil and groundwater. Biotransfer to venison Dust emissions and volatilization from soil to ambient air.	Groundwater		<u>Subsurface Soil</u> TCL-VOCs TCL-SVOCs Metals Agent Breakdown Products Explosives	Definitive data in CESAS Level B data packages	8 subsurface soil samples (5 residuum monitoring well boreholes)+QC	
	ESE, 1998	Surfacewater runoff from soil to ambient air.					14 existing from SIs at 108(7) and 88(6), IT, 1999	
	EPA, 1983	Erosion and runoff from soil to surface water and sediment						
	SAIC, Remedial Investigation/ Baseline Risk Assessment Report, 1999	<u>Potential Receptors</u> Groundskeeper (current and future) Construction Worker (future) Resident (future) Recreational Site User (current and future)						
	IT, Site Investigations Parcels 108(7) and 88(6), 1999	<u>PSSC</u> decontaminating chemicals metals munitions						
					Surface Water			
					Sediment			
					Depositional Soil			

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
CWM - Chemical warfare materials.
DOD - U.S. Department of Defense.

ESE - Environmental Science and Engineering.
PSSC - Potential site-specific chemicals.
QC - Quality control.
RI - Remedial investigation.
SAIC - Science Application International Corporation.

TCL - Target compound list.
USACE - U.S. Army Corps of Engineers.
VOC - Volatile organic compound.
SVOC - Semi-volatile organic compound.
EPA - U.S. Environmental Protection Agency.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating the potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates consistent and comprehensive evaluation of human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact with a contaminated source medium.

Primary contaminant releases were probably limited to leaks and spills that entered surface soil, and potentially buried materials. Potential contaminant transport pathways include infiltration to subsurface soil, infiltration and leaching to groundwater, discharge of groundwater to surface water, erosion and runoff to surface water and sediment, dust emissions and volatilization to ambient air from surface soil, and biotransfer to deer through browsing.

3.3.1 Current Land Use

The Ranges Near Training Area T-24A are not currently utilized. A groundskeeper does maintain the road through the site. For the current land-use scenario, the recreational site user is evaluated in addition to the groundskeeper because it is possible that a trespasser could circumvent security measures at the base perimeter and wander into this area. Exposure to fish and venison will not be evaluated for the recreational site user because the stream that transects the site is not large enough to sustain any sizeable fish population, and the restricted access of the site would discourage hunting. Other potential receptors considered, but not included under current land-use scenarios, are the:

- Construction worker: The site is unused, and no development or construction is occurring or scheduled.

- **Resident:** The site is not currently used for residential purposes.

3.3.2 Future Land Use

Future land-use in this area is expected to be a remediation reserve (FTMC, 1997). The site may not be deemed safe for public access until remediation has been completed because of the potential for UXO (FTMC, 1997). Plausible future land-use receptor scenarios addressed in the CSEM include:

- **Resident.** Although the site is expected to be used as open space and not be developed, the resident is considered in order to provide information for the project manager and regulators.
- **Groundskeeper.** The site is likely to have areas that will need to be maintained in the future.
- **Construction Worker.** Although the site is not expected to be developed in the near future, construction/demolition or maintenance of buried utilities may occur at some point in the future, thus this receptor is evaluated.
- **Recreational Site User.** The site is planned for recreational use once the remediation is completed. Deer hunting is a potential future exposure pathway for the recreational site user.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

3.3.3 Decision-Making Process, Data Uses, and Needs

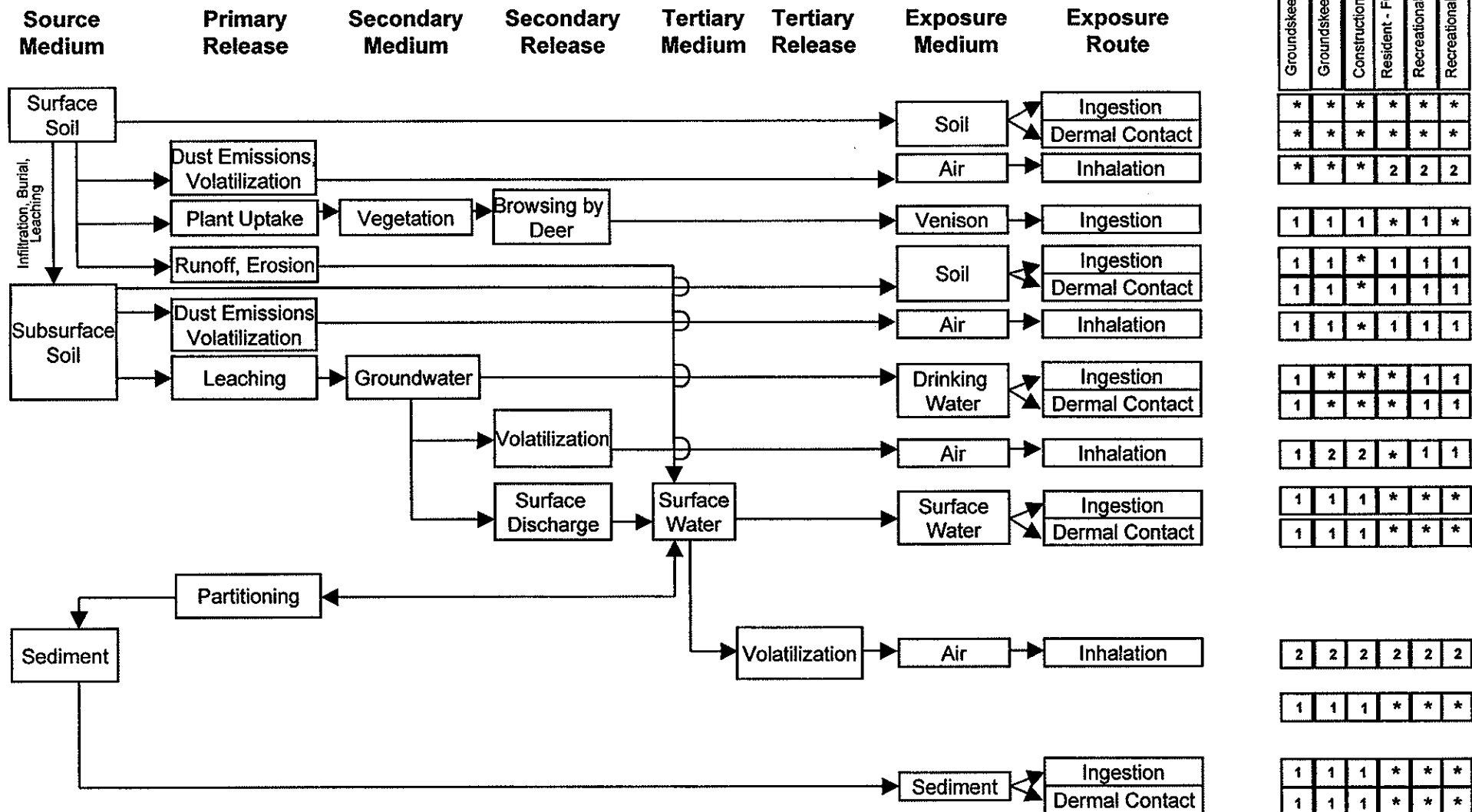
The decision-making process consists of a seven-step process that is presented in detail in Sections 3.2 and 4.3 of the WP and will be followed during the supplemental RI at the Ranges Near Training Area T-24A site. Data uses and needs are summarized in Table 3-1.

3.3.4 Risk Evaluation

Confirmation of contamination at the Ranges Near Training Area T-24A site will be based upon a comparison of detected site contaminants to the most current guidance criteria. The data will be reported and evaluated using EPA definitive data with CESAS Level B criteria. Data packages will contain RLs sufficient to determine whether the established guidance criteria are exceeded in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting additional decision-making steps, such as remedial action and risk assessment, if necessary.

3.3.5 Data Types and Quality

Figure 3-1
Human Health Conceptual Site Exposure Model
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.

1 = Incomplete exposure pathway.

2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

Surface soil, subsurface soil, and groundwater will be sampled and analyzed to meet the objectives of the supplemental RI for the Ranges Near Training Area T-24A site. In association with these definitive samples, quality assurance/quality control (QA/QC) samples will be collected for sample types as described in Chapter 4.0 of this SFSP.

Samples will be analyzed by EPA-approved SW-846 methods Update III, where available. Sample data will comply with EPA definitive data requirements and will be reported using hard copy data packages. In addition to meeting the quality needs of this supplemental RI SFSP, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.3.6 Precision, Accuracy, and Completeness

Laboratory requirements for precision, accuracy, and completeness for this supplemental RI are provided in Chapter 9.0 of the QAP.

4.0 Field Investigations

This chapter describes the field activities that will be performed at Ranges Near Training Area T-24A, including UXO clearance and field sampling and analysis activities.

4.1 UXO Survey Requirements and Utility Clearance

The Ranges Near Training Area T-24A falls within the “Possible Explosive Ordnance Impact Area” shown on Plate 10 of the *FTMC Archive Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999). The presence of UXO and CWM is possible at the Ranges Near Training Area T-24A site. Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings in addition to conducting utility clearances before installing soil borings. The site-specific UXO safety plan provides technical guidance for ordnance and explosives avoidance and construction activities for hazardous, toxic, and radiological waste investigations, sample collection, and analyses at the Ranges Near Training Area T-24A. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000a). CWM surveys will be conducted by USACE, Huntsville, (Parsons Engineering Service, Inc. 1999).

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendices D and E of the approved SAP (IT, 2000a) site-specific UXO safety plan.

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling activities, a downhole UXO survey will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet bgs, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at all locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP. The site manager will mark the proposed locations with stakes, coordinate with the installation to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

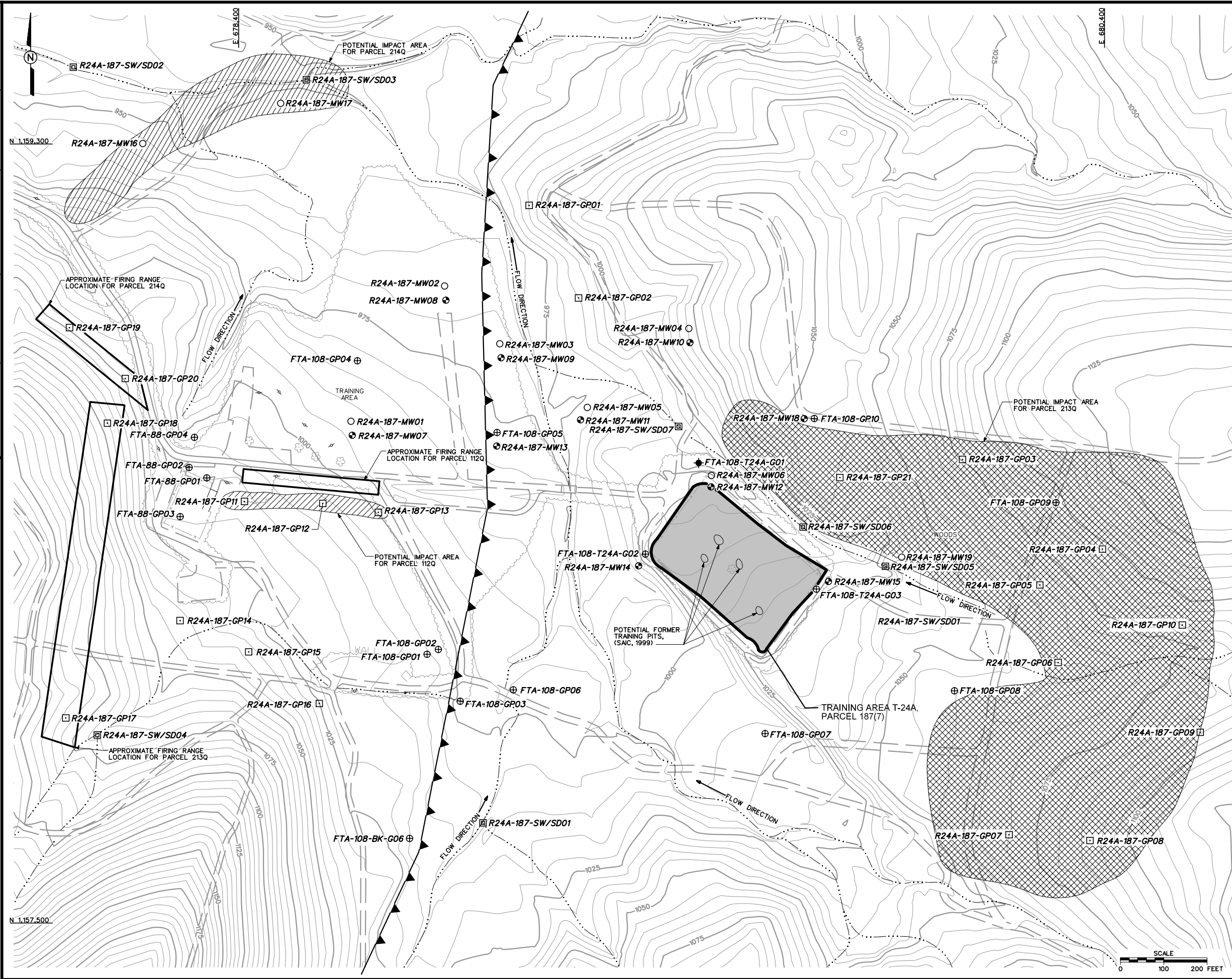
The environmental sampling program during the supplemental RI for the Ranges Near Training Area T-24A site includes the collection of surface soil samples and subsurface soil samples, and groundwater samples for chemical analyses. IT will evaluate data collected from the SIs at Parcels 88(6) and 108(7) in conjunction with data collected from the proposed sampling locations as part of this supplemental RI. The proposed sampling is intended to provide sufficient data to complete the supplemental RI; however, if potential contaminant sources within the fenced area of Parcel 187(7) and northwest of the fenced area of Parcel 187(7) (Figure 4-1) are identified during the chemical CWM investigation by Parsons Engineering Science, Inc., additional soil and groundwater samples may be collected. These additional samples will be tracked through project variance reports and reported in the supplemental RI report.

4.2.1 Surface Soil Sampling

Twenty-nine surface soil samples will be collected during the supplemental RI to determine if contaminants associated with firing range activities, fog oil use, and chemical warfare training activities are present.

4.2.1.1 Sample Locations and Rationale

The surface soil sampling rationale is listed in Table 4-1. Proposed sampling locations are shown on Figure 4-1. Surface soil sample designations and required QA/QC samples are summarized in Table 4-2. The proposed surface soil samples will be collected from eight monitoring well locations and twenty-one surface soil sample locations.



- LEGEND:**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - BRIDGE
 - SURFACE DRAINAGE / CREEK
 - FENCE
 - UTILITY POLE
 - THRUST FAULT
 - AREAS OF MOUNDS AND TRENCHES
 - AREA OF SURFACE MOUNDS
 - EXISTING BEDROCK MONITORING WELL LOCATION
 - EXISTING RESIDUUM MONITORING WELL LOCATION
 - PROPOSED BEDROCK MONITORING WELL LOCATION
 - PROPOSED RESIDUUM MONITORING WELL LOCATION
 - PROPOSED SURFACE SOIL SAMPLE LOCATION
 - PROPOSED SURFACE/WATER SEDIMENT SAMPLE LOCATION

NOTE:

1. SURFACE AND SUBSURFACE SOIL SAMPLES WILL BE COLLECTED FROM PROPOSED RESIDUUM MONITORING WELL LOCATIONS.

FIGURE 4-1
SAMPLE LOCATION MAP
RANGES NEAR TRAINING AREA T-24A
PARCELS 187(7), 112Q, 113Q-X, 213Q
AND 214Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT MCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

(Page 1 of 6)

Sample Location	Sample Media	Sampling Location Rationale
R24A-187-MW01	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW01 will be installed about 800 feet west of existing well FTA-108-T24A-G01. This location is hydraulically downgradient of FTA-88-GP01 which had trace concentrations of benzene detected in groundwater during the SI at Parcel 88(6). This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA-88-GP01 are associated with contaminants in FTA-108-T24A-G01. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 45 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW02	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW02 will be installed about 700 feet northwest of existing well FTA-108-T24A-G01. This location is also hydraulically downgradient of FTA-88-GP01. This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA-88-GP01 are associated with contaminants in FTA-108-T24A-G01. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 30 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW03	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW03 will be installed about 500 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 30 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW04	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW04 will be installed about 350 feet north of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 45 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW05	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW05 will be installed about 300 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and the splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 30 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW06	GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW06 will be installed adjacent to FTA-108-T24A-G01 to provide definitive vertical groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 45 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW07	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW07 will be installed about 800 feet west of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW01. This location is also hydraulically downgradient of FTA-88-GP01. This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA-88-GP01 are associated with contaminants in FTA-108-T24A-G01. It is estimated that the monitoring well will be installed to a depth of approximately 90 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW08	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW08 will be installed about 700 feet northwest of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW02. This location is also hydraulically downgradient of FTA-88-GP01. This location will provide definitive groundwater quality data to determine if trace concentrations of contaminants in FTA-88-GP01 are associated with contaminants in FTA-108-T24A-G01. It is estimated that the monitoring well will be installed to a depth of approximately 70 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW09	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW09 will be installed about 500 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and the splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW03. It is estimated that the monitoring well will be installed to a depth of approximately 75 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

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Sample Location	Sample Media	Sampling Location Rationale
R24A-187-MW10	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW10 will be installed about 350 feet north of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW04. It is estimated that the monitoring well will be installed to a depth of approximately 110 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW11	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW11 will be installed about 300 feet northwest of existing well FTA-108-T24A-G01 on the east side of the north-south trending surface water tributary and the splay fault trace to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well R24A-187-MW05. It is estimated that the monitoring well will be installed to a depth of approximately 70 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW12	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW12 will be installed adjacent to FTA-108-T24A-G01 to provide definitive vertical groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will also be paired with residuum groundwater monitoring well R24A-187-MW06. It is estimated that the monitoring well will be installed to a depth of approximately 150 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW13	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW13 will be installed about 450 feet west of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with residuum groundwater monitoring well FTA-108-GP05. It is estimated that the monitoring well will be installed to a depth of approximately 75 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW14	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW14 will be installed about 250 feet south-southwest of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with existing residuum groundwater monitoring well FTA-108-T24A-G02. It is estimated that the monitoring well will be installed to a depth of approximately 100 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW15	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW15 will be installed about 400 feet southeast of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with existing residuum groundwater monitoring well FTA-108-T24A-G03. It is estimated that the monitoring well will be installed to a depth of approximately 110 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW16	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW16 will be installed about 1400 feet northwest of existing well FTA-108-T24A-G01. This location is in the impact area of Parcel 214Q. This location will provide definitive groundwater quality data to determine if firing range activities have impacted groundwater in a northwestern location. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 35 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW17	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW17 will be installed about 1200 feet northwest of existing well FTA-108-T24A-G01. This location is in the impact area of Parcel 214Q. This location will provide definitive groundwater quality data to determine if firing range activities have impacted groundwater in a northwestern location. Groundwater elevations will be used to establish horizontal and vertical groundwater flow directions. It is estimated that the monitoring well will be installed to a depth of approximately 35 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-MW18	GROUNDWATER	Bedrock groundwater monitoring well R24A-187-MW18 will be installed about 300 feet east north-east of existing well FTA-108-T24A-G01 to provide definitive groundwater quality data and groundwater elevations to establish horizontal and vertical groundwater flow directions. It will be paired with existing residuum groundwater monitoring well FTA-108-GP10. It is estimated that the monitoring well will be installed to a depth of approximately 110 feet below ground surface. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.

Table 4-1

**Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

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Sample Location	Sample Media	Sampling Location Rationale
R24A-187-MW19	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Residuum groundwater monitoring well R24A-187-MW19 will be installed about 500 feet east-southeast of existing well FTA-108-T24A-G01. This location is hydraulically upgradient of Parcel 113Q-X. It is estimated that the monitoring well will be installed to a depth of approximately 65 feet below ground surface. Surface and subsurface soil and groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP01	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP02	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP03	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-88-GP04	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 88(6) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP01	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP02	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP03	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP04	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP05	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP06	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP07	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP08	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP09	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-GP10	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

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Sample Location	Sample Media	Sampling Location Rationale
FTA-108-T24A-GP01	GROUNDWATER	Existing bedrock monitoring well associated with the SI at Parcel 187(7) and at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-T24A-GP02	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-T24A-GP03	GROUNDWATER	Existing residuum monitoring well associated with the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
FTA-108-BK-G06	GROUNDWATER	Existing residuum monitoring well associated with the background groundwater sampling and the SI at Parcel 108(7) will be sampled with proposed monitoring wells to provide a snapshot of site conditions for Parcels 187(7), 213Q, 214Q, and 112Q. Groundwater samples will be analyzed for agent breakdown products, metals, nitroexplosives, volatile and semivolatile compounds.
R24A-187-GP01	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a western facing slope within the firing fan of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP02	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a western facing slope within the firing fan of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP03	SURFACE SOIL	Surface soil sample will be collected within a surface depression at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP04	SURFACE SOIL	Surface soil sample will be collected within a surface depression at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP05	SURFACE SOIL	Surface soil sample will be collected on a conical mound at a suspected target/impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP06	SURFACE SOIL	Surface soil sample will be collected within a surface depression of a conical mound at a suspected target/impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP07	SURFACE SOIL	Surface soil sample will be collected at the base of a conical mound at a suspected target/impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP08	SURFACE SOIL	Surface soil sample will be collected within a linear surface depression (trench) at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP09	SURFACE SOIL	Surface soil sample will be collected within a linear surface depression (trench) at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP10	SURFACE SOIL	Surface soil sample will be collected within a linear surface depression (trench) at a suspected impact area within the firing fan of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP11	SURFACE SOIL	Surface soil samples will be collected at a suspected target/impact area on a linear mound within the firing fan of Parcel 112Q and potential where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP12	SURFACE SOIL	Surface soil samples will be collected at a suspected target/impact area on a linear mound within the firing fan of Parcel 112Q and potential where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.

Table 4-1

Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

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Sample Location	Sample Media	Sampling Location Rationale
R24A-187-GP13	SURFACE SOIL	Surface soil samples will be collected at a suspected target/impact area on a linear mound within the firing fan of Parcel 112Q and potential where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP14	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a north-facing slope within the firing fan of Parcel 112Q and within Range 24A where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP15	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a north-facing slope within the firing fan of Parcel 112Q and within Range 24A where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP16	SURFACE SOIL	Surface soil samples will be collected at a suspected impact area along a north-facing slope within the firing fan of Parcel 112Q and within Range 24A where fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP17	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP18	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 213Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP19	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP20	SURFACE SOIL	Surface soil samples will be collected at a suspected firing line of Parcel 214Q and where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-GP21	SURFACE SOIL	Surface soil samples will be collected northeast of Parcel 187(7) where potential fog oil use is suspected. Samples will be analyzed for metals, semivolatile compounds, CWM breakdown compounds, and nitroexplosives.
R24A-187-SW/SD01	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located approximately 125 ft northeast of FTA-108-BK-G06 to determine the presence or absence of contamination from runoff flowing north from the topographic high south south of Parcel 112Q. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD02	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from the South Branch of Cane Creek northwest of potential impact area of Parcel 214Q to determine the presence or absence of contamination from runoff flowing northwest from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD03	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from the confluence of the surface drainage feature and the South Branch of Cane Creek in the northwest corner of the study area near the impact area of Parcel 214Q to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD04	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from the surface drainage feature on the southwest corner of the study area near the firing line of Parcel 213Q to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD05	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located near the northeast corner of Parcel 113Q-X to determine the presence or absence of contamination from runoff flowing north. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)

Table 4-1

**Site Sampling Rationale
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

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Sample Location	Sample Media	Sampling Location Rationale
R24A-187-SW/SD06	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located near the northcentral section of Parcel 113Q-X to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD07	SURFACE WATER SEDIMENT	Surface water and sediment will be collected from surface drainage feature located approximately 175 ft northwest of Parcel 187(7) to determine the presence or absence of contamination from runoff flowing north from the study area. Surface water and sediment samples will be analyzed for TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)

Table 4-2

**Surface and Subsurface Soil Sample Designations and QA/AC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
R24A-187-MW01	R24A-187-MW01-SS-JG0001-REG R24A-187-MW01-DS-JG0002-REG	0-1 a			R24A-187-MW01-SS-JG0001-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
R24A-187-MW02	R24A-187-MW02-SS-JG0003-REG R24A-187-MW02-DS-JG0004-REG	0-1 a				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
R24A-187-MW03	R24A-187-MW03-SS-JG0005-REG R24A-187-MW03-DS-JG0006-REG	0-1 a				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
R24A-187-MW04	R24A-187-MW04-SS-JG0007-REG R24A-187-MW04-DS-JG0010-REG	0-1 a	R24A-187-MW04-SS-JG0008-FD	R24A-187-MW04-SS-JG0009-FS		TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
R24A-187-MW05	R24A-187-MW05-SS-JG0011-REG R24A-187-MW05-DS-JG0012-REG	0-1 a				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs
R24A-187-MW16	R24A-187-MW16-SS-JG0013-REG R24A-187-MW16-DS-JG0014-REG	0-1 a				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
R24A-187-MW17	R24A-187-MW17-SS-JG0015-REG R24A-187-MW17-DS-JG0016-REG	0-1 a				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
R24A-187-MW19	R24A-187-MW19-SS-JG0017-REG R24A-187-MW19-DS-JG0018-REG	0-1 a				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products; TCL VOCs (subsurface soil only)
R24A-187-GP01	R24A-187-GP01-SS-JG0019-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP02	R24A-187-GP02-SS-JG0020-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP03	R24A-187-GP03-SS-JG0021-REG	0-1			R24A-187-GP03-SS-JG0021-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP04	R24A-187-GP04-SS-JG0022-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP05	R24A-187-GP05-SS-JG0023-REG	0-1	R24A-187-GP05-SS-JG0024-FD			TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products

Table 4-2

**Surface and Subsurface Soil Sample Designations and QA/AC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
R24A-187-GP06	R24A-187-GP06-SS-JG0025-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP07	R24A-187-GP07-SS-JG0026-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP08	R24A-187-GP08-SS-JG0027-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP09	R24A-187-GP09-SS-JG0028-REG	0-1			R24A-187-GP09-SS-JG0028-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP10	R24A-187-GP10-SS-JG0029-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP11	R24A-187-GP11-SS-JG0030-REG	0-1	R24A-187-GP11-SS-JG0031-FD	R24A-187-GP11-SS-JG0032-FS		TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP12	R24A-187-GP12-SS-JG0033-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP13	R24A-187-GP13-SS-JG0034-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP14	R24A-187-GP14-SS-JG0035-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP15	R24A-187-GP15-SS-JG0036-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP16	R24A-187-GP16-SS-JG0037-REG	0-1			R24A-187-GP16-SS-JG0037-MS/MSD	TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP17	R24A-187-GP17-SS-JG0038-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP18	R24A-187-GP18-SS-JG0039-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP19	R24A-187-GP19-SS-JG0040-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP20	R24A-187-GP20-SS-JG0041-REG	0-1				TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products
R24A-187-GP21	R24A-187-GP21-SS-JG0042-REG	0-1	R24A-187-GP21-SS-JG0043-FD			TCL SVOCs, TAL Metals, Nitroexplosives, and CWM breakdown products

Table 4-2

**Surface and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

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^a Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

CWM- chemical warfare material

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by hand auger as specified in Section 4.9.1.1 of the SAP. Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only, and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from eight monitoring well boreholes during the supplemental RI at the Ranges Near Training Area T-24A site. The soil sample from each boring exhibiting the highest reading on a PID will be sent to the laboratory for analysis. If none of the sample intervals indicate elevated PID readings, the deepest sample interval will be submitted to the laboratory.

4.2.2.1 Sample Locations and Rationale

Subsurface soil sampling rationale is presented in Table 4-1. A total of eight subsurface soil samples will be collected. Subsurface soil sample designations and required QA/QC samples are summarized in Table 4-2. The proposed subsurface soil sampling locations are presented on Figure 4-1.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected using direct-push technology specified in Section 4.7.1.1 of the SAP.

Subsurface soil samples will be collected continuously to 12 feet bgs or refusal is reached at each of the proposed locations. A detailed lithological log of each borehole will be recorded by the on-site geologist. Samples from the entire length of the boring will be field screened using a PID. Samples will be collected for headspace screening as specified in Section 4.15 of the SAP. Typically, the soil sample from each boring exhibiting the highest reading on a PID (above background) will be sent to the laboratory for analysis. If none of the samples indicate readings exceeding background using the PID, the deepest sample interval will be submitted to the laboratory for analyses. Subsurface soil samples will be selected for analyses from any depth

interval if the on-site geologist suspects potential site specific chemicals (PSSC) at the depth interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analyses. More than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of PSSCs. Subsurface soil sample designations, depths, and required QA/QC sample quantities are listed in Table 4-2.

Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this supplemental RI SFSP are listed in Chapter 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Monitoring Well Installation

Nine residuum and ten bedrock monitoring wells are proposed at the Ranges Near Training Area T-24A. The monitoring wells will be installed using a combination of wireline coring, hollow-stem auger, and air-rotary drilling methods. The wells will be installed to provide information on water quality and groundwater flow in both the residuum and bedrock aquifers. Previous investigations by SAIC (1995) and IT indicate the presence of groundwater contamination in one bedrock monitoring well (T24A-G01, subsequently renamed FTA-108-T24A-G01 during the SIs at Parcels 88[6] and 187[7]) at the Ranges Near Training Area T-24A site. Therefore, proposed bedrock monitoring wells will be completed with the screen section of each well installed at an elevation overlapping the elevation of the screened interval of FTA-108-T24A-G01 (approximately 900 to 910 feet mean sea level). The monitoring wells will be installed and developed as specified in Section 4.8 and Appendix C of the SAP.

4.2.3.1 Monitoring Well Locations and Rationale

Permanent residuum and bedrock monitoring well clusters will be installed at locations hydraulically downgradient from FTA-108-T24A-G01. At locations upgradient of FTA-108-T24A-G01 where only residuum wells currently exist, well clusters will be formed by installing a bedrock monitoring well adjacent to the existing residuum monitoring well.

Nine proposed residuum monitoring wells, designated R24A-187-MW01 through R24A-187-MW06, and R24A-187-MW16, R24A-187-MW17, and R24A-187-MW19, will be installed to determine the local groundwater flow direction and delineate the lateral extent of contamination,

if any, in the residuum aquifer. Proposed monitoring wells will be placed at locations shown on Figure 4-1. Table 4-1 presents residuum monitoring well sampling rationale.

Ten proposed bedrock monitoring wells designated R24A-187-MW07 through R24A-187-MW15, and R24A-187-MW18 will be installed to determine bedrock groundwater flow direction and to delineate groundwater contamination in the bedrock. The locations of the existing and proposed monitoring wells are presented on Figure 4-1. Table 4-1 presents bedrock monitoring well sampling rationale.

4.2.3.2 Residuum Monitoring Wells

Nine residuum monitoring well boreholes will be drilled and installed using 4.25 -inch inside diameter (ID) hollow-stem augers. If necessary, air rotary methods will be used to advance the residuum boreholes through more competent quartz zones. Residuum monitoring wells will be drilled to a minimum of 15 feet below the first groundwater bearing zone estimated to range from about 30 to 40 feet bgs. The well casing will consist of new 2-inch ID, Schedule 40, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 feet long. Attached to the bottom of the screen will be a sump, approximately 5 feet long, composed of new, 2-inch ID, Schedule 40, threaded, flush joint PVC pipe. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. The filter pack will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. The filter pack will consist of 20/40 silica sand. A bentonite seal, approximately 5 feet thick, will be placed above the filter pack. The remaining annular space will be grouted with a bentonite-cement mixture (described above) and tremied in place with a side discharge tremie from the top of the bentonite seal to ground surface. The residuum monitoring wells will be developed as specified in Section 4.8 and Appendix C of the SAP. Groundwater samples will not be collected from residuum wells for a period of at least 14 days after well development. Investigation-derived waste (IDW) will be containerized and staged in accordance with Section 5.7 of the SFSP.

4.2.3.3 Bedrock Monitoring Wells

Ten bedrock monitoring well boreholes will be drilled using a combination of hollow-stem auger wireline coring, and air rotary drilling techniques. Estimated bedrock monitoring well depths are included in Table 4-2. Well depths may be modified based on the results of the coring results.

Boreholes to be completed as bedrock monitoring wells will first be advanced using hollow-stem auger drilling and split spoon sampling. Subsurface soil samples will be collected using hollow-stem auger drilling equipment and a 2-inch diameter split spoon sampler (in accordance with American Society for Testing and Materials [ASTM] Method D 1586 [ASTM, 1992]) as specified in Section 4.7.1.2 of the SAP.

Soil samples will be collected at 5-foot intervals from ground surface to split spoon refusal. For the purpose of this supplemental RI, split spoon refusal is defined as less than 6 inches penetration after 50 blows in a standard penetration test. Samples will be collected using a 24-inch-long, 2-inch-diameter split-spoon sampler. Lithologic samples will be collected and described to provide a detailed lithologic log. The soil samples collected will be logged in accordance with ASTM Method D 2488 using the Unified Soil Classification System and screened in the field using a PID (ASTM, 1993). There will not be any samples collected for laboratory analyses. Upon reaching split spoon refusal, the auger stem will remain in the borehole to serve as a temporary casing so that bedrock coring can be conducted.

Upon reaching split spoon sampler refusal, continuous bedrock coring will be performed in accordance with ASTM Method D 2113, Standard Practice for Diamond Core Drilling for Site Investigation (ASTM, 1993). Bedrock coring will be performed with a (PQ) wireline triple tube core barrel with a 10-foot longitudinally split inner tube to collect core samples continuously from split spoon refusal to 5 feet below auger refusal.

Bedrock cores will be described to provide a detailed lithologic log in accordance with methods outlined in CESAS Manual DM 1110-1-1 (USACE, 1983). Structural features such as folding, fracturing and brecciation, which may indicate the presence of faulting, will be noted. Coring will be performed continuously from auger refusal to about 5 feet below the first groundwater bearing.

After advancing to approximately 5 feet below auger refusal, an air rotary rig with a 12-inch percussion bit or rotary bit will be used to ream the borehole from ground surface to the depth hole is cored. Eight-inch ID carbon steel International Pipe Standard outer casing will be

installed into the borehole from ground surface to the bottom of the borehole. A minimum of 2-inch annular space between the outer casing and borehole wall will be required. The 8-inch carbon steel outer casing will be grouted in-place using a tremie pipe suspended in the annulus outside of the casing. Bentonite-cement grout will be mixed using approximately 6.5 to 7 gallons of water, and 5 pounds of bentonite per 94 pound bag of Type I Portland cement. After the grout has cured a minimum of 48 hours, a PQ wireline core barrel will be used to collect continuous bedrock core and to advance the borehole to the target depth (Table 4-1). Target depths were determined based on the elevation of the well screen interval of FTA-108-T24A-G01. The depth into competent bedrock will be increased if groundwater is not encountered. After completion of core sample collection, a 7-7/8-inch air percussion bit will be used to ream the hole from the bottom of the surface casing to the borehole target depth. The compressor on the drill rig will be equipped with an air filter between the compressor and the drill bit.

Four-inch monitoring wells will be installed inside the outer casing at each proposed bedrock well location. The well casing will consist of new, 4-inch ID, Schedule 80, threaded, flush-joint, PVC pipe. Attached to the bottom of the well casing will be a section of new threaded, flush joint 0.010-inch continuous wrap PVC well screen approximately 10 feet long. Attached to the bottom of the screen will be a sump, approximately 5 feet long, composed of new, 4-inch ID, Schedule 80, threaded, flush joint PVC pipe. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. The filter pack will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. The filter pack will consist of 20/40 silica sand. A bentonite seal, approximately 5 feet thick, will be placed above the filter pack. The remaining annular space will be grouted with a bentonite-cement mixture (described above) and tremied in place with a side discharge tremie from the top of the bentonite seal to ground surface. The bedrock monitoring wells will be developed as specified in Section 4.8 and Appendix C of the SAP. Groundwater samples will not be collected from bedrock wells for a period of at least 14 days after well development. IDW will be containerized and staged in accordance with Section 5.7 of the SFSP.

4.2.4 Monitoring Well Groundwater Sampling

Thirty-seven groundwater samples will be collected from the 18 existing wells and 19 proposed monitoring wells at the Ranges Near Training Area T-24A to determine the nature and extent of CWM breakdown products, metals, VOCs, SVOC, and explosives in groundwater.

4.2.4.1 Monitoring Well Sample Locations and Rationale

The groundwater sampling rationale are presented in Table 4-1. A total of 37 groundwater samples will be collected at the Ranges Near Training Area T-24A. The existing and proposed permanent monitoring well locations are presented on Figure 4-1.

4.2.4.2 Monitoring Well Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from the 37 monitoring wells to be sampled as part of the supplemental RI. Groundwater elevations will be used to define the groundwater flow in the residuum and bedrock aquifers. Water levels will be measured as outlined in Section 4.18 of the SAP. Groundwater samples will be collected from the existing and proposed permanent monitoring wells for the parameters listed in Table 4-3. Monitoring well locations are presented on Figure 4-1. Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Sample documentation and chain of custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Surface Water Sampling

Seven surface water samples will be collected from the ephemeral and perennial streams that flow in the vicinity of the Ranges Near Training Area T-24A.

4.2.5.1 Surface Water Sample Locations and Rationale

Surface water sampling rationale is listed in Table 4-1. Surface water samples will be collected from the proposed locations on Figure 4-1. Surface water sample designations and required QA/QC samples are listed in Table 4-4. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

4.2.5.2 Sample Collection

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
R24A-187-MW01	R24A-187-MW01-GW-JG3001-REG	Groundwater	a			R24A-187-MW01-GW-JG3001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW02	R24A-187-MW02-GW-JG3002-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW03	R24A-187-MW03-GW-JG3003-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW04	R24A-187-MW04-GW-JG3004-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW05	R24A-187-MW05-GW-JG3005-REG	Groundwater	a	R24A-187-MW05-GW-JG3006-FD	R24A-187-MW05-GW-JG3007-FS		TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW06	R24A-187-MW06-GW-JG3008-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW07	R24A-187-MW07-GW-JG3009-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW08	R24A-187-MW08-GW-JG3010-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW09	R24A-187-MW09-GW-JG3011-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW10	R24A-187-MW10-GW-JG3012-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW11	R24A-187-MW11-GW-JG3013-REG	Groundwater	a			R24A-187-MW11-GW-JG3013-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW12	R24A-187-MW12-GW-JG3014-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW13	R24A-187-MW13-GW-JG3015-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW14	R24A-187-MW14-GW-JG3016-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW15	R24A-187-MW15-GW-JG3017-REG	Groundwater	a	R24A-187-MW15-GW-JG3018-FD			TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
R24A-187-MW16	R24A-187-MW16-GW-JG3019-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW17	R24A-187-MW17-GW-JG3020-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW18	R24A-187-MW18-GW-JG3021-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
R24A-187-MW19	R24A-187-MW18-GW-JG3022-REG	Groundwater	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-T24A-G01	FTA-108-T24A-G01-GW-JG3023-REG	Groundwater	87-97'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-T24A-G02	FTA-108-T24A-G02-GW-JG3024-REG	Groundwater	17-27'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-T24A-G03	FTA-108-T24A-G03-GW-JG3025-REG	Groundwater	26-36'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP01	FTA-108-GP01-GW-JG3026-REG	Groundwater	9-24'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP02	FTA-108-GP02-GW-JG3027-REG	Groundwater	9-24'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP03	FTA-108-GP03-GW-JG3028-REG	Groundwater	8-23'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP04	FTA-108-GP04-GW-JG3029-REG	Groundwater	14-29'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP05	FTA-108-GP05-GW-JG3030-REG	Groundwater	9-24'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP06	FTA-108-GP06-GW-JG3031-REG	Groundwater	4-14'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP07	FTA-108-GP07-GW-JG3032-REG	Groundwater	4-14'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP08	FTA-108-GP08-GW-JG3033-REG	Groundwater	22-42'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-GP09	FTA-108-GP09-GW-JG3034-REG	Groundwater	21-41'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A,
Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
FTA-108-GP10	FTA-108-GP10-GW-JG3035-REG	Groundwater	20-35'			FTA-108-GP10-GW-JG3035-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-88-GP01	FTA-88-GP01-GW-JG3036-REG	Groundwater	4-19'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-88-GP02	FTA-88-GP02-GW-JG3037-REG	Groundwater	4-19'			FTA-88-GP02-GW-JG3037-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-88-GP03	FTA-88-GP03-GW-JG3038-REG	Groundwater	14-29'	FTA-88-GP03-GW-JG3039-FD	FTA-88-GP03-GW-JG3040-FS		TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-88-GP04	FTA-88-GP04-GW-JG3041-REG	Groundwater	5-15'				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products
FTA-108-BK-G06	FTA-108-BK-G06-GW-JG3042-REG	Groundwater	9-19'	FTA-108-BK-G06-GW-JG3043-FD			TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

CWM-chemical warfare material

Table 4-4

**Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
R24A-187-SW/SD01	R24A-187-SW/SD01-SW-JG2001-REG R24A-187-SW/SD01-SD-JG1001-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD02	R24A-187-SW/SD02-SW-JG2002-REG R24A-187-SW/SD02-SD-JG1002-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD03	R24A-187-SW/SD03-SW-JG2003-REG R24A-187-SW/SD03-SD-JG1003-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD04	R24A-187-SW/SD04-SW-JG2004-REG R24A-187-SW/SD04-SD-JG1004-REG	Surface Water Sediment	a			R24A-187-SW/SD04-SW-JG2004-MS R24A-187-SW/SD04-SD-JG1004-MSD	TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD05	R24A-187-SW/SD05-SW-JG2005-REG R24A-187-SW/SD05-SD-JG1005-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD06	R24A-187-SW/SD06-SW-JG2006-REG R24A-187-SW/SD06-SD-JG1006-REG	Surface Water Sediment	a				TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)
R24A-187-SW/SD07	R24A-187-SW/SD07-SW-JG2007-REG R24A-187-SW/SD07-SD-JG1007-REG	Surface Water Sediment	a	R24A-187-SW/SD07-SW-JG2008-DUP R24A-187-SW/SD07-SD-JG1008-DUP	R24A-187-SW/SD07-SW-JG2009-FS R24A-187-SW/SD07-SD-JG1009-FS		TCL VOCs, TCL SVOCs, TAL Metals, and Nitroexplosives, CWM Breakdown products TOC, Grain Size (sediment only)

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

CWM-chemical warfare material

Surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.5.

4.2.6 Sediment Sampling

Seven sediment samples will be collected from the Ranges Near Training Area T-24A. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.5.

4.2.6.1 Sediment Sample Locations and Rationale

The proposed locations for sediment samples are shown in Figure 4-1. The sediment sampling rationale is presented in Table 4-1. The sediment sample designation and QA/QC sample requirements are listed in Table 4-4. The actual sediment sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

4.2.6.2 Sample Collection

Sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5.

4.2.7 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment primarily to ensure that contaminants are not introduced into samples from location to location. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP. Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.2.8 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the

U.S. State Plane Coordinate System, Alabama East Zone, North American Datum 1983.
Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use monitoring wells to determine water levels, a higher level of survey accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP. All areas at this site must be cleared for UXO avoidance before any surveying activities will commence.

4.2.9 Analytical Program

Samples collected at the locations specified in Table 4-1 will be analyzed for various chemical constituents (including CWM breakdown products) and physical properties based on the PSSCs historically used at the site and EPA, ADEM, FTMC, and USACE requirements. Target analyses for groundwater and subsurface soil samples collected from the Ranges Near Training Area T-24A include:

- Target compound list VOCs by EPA Method 5035/8260B
- TCL SVOCs by EPA Method 8270C
- Target analyte list metals by EPA Method 6010B/7000
- CWM breakdown products by EPA Method 8270 (modified) and Method 8321
- Nitroexplosives by EPA Method 8330.

The surface soil samples will be analyzed for the following list of parameters:

- Target compound list SVOCs by EPA Method 8270C
- Target analyte list metals by EPA Method 6010B/7000
- CWM breakdown products by EPA Method 8270 (modified) and Method 8321
- Nitroexplosives by EPA Method 8330.

The samples will be analyzed using EPA SW-846 Update III Method where applicable, as presented in Table 4-5 of this SFSP and Table 6-1 of the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using CLP-like forms. These

Table 4-5

Analytical Samples
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ^a					Quanterra	QA Lab
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Splits w/ QA Lab (5%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis	Total No. Analysis
Ranges Near Training Area T-24A, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q37 groundwater samples and 29 surface soil samples, 8 subsurface soil samples, 7 surface water, 7 sediment													
TCL VOCs	8260B	water	normal	44	1	44	4	2	4		1	57	2
TCL SVOCs	8270C	water	normal	44	1	44	4	2	4		1	57	2
TAL Metals	6010B/7000	water	normal	44	1	44	4	2	4		1	57	2
Nitroexplosives	8330	water	normal	44	1	44	4	2	4		1	17	2
CWM Bkdn Products	8321/8270M	water	normal	44	1	44	4	2	4		1	17	2
TCL VOCs	8260B	soil	normal	16	1	16	1	1	1		1	20	1
TCL SVOCs	8270C	soil	normal	44	1	44	4	2	4		1	57	2
TAL Metals	6010B/7000	soil	normal	44	1	44	4	2	4		1	57	2
Nitroexplosives	8330	soil	normal	44	1	44	4	2	4		1	57	2
CWM Bkdn Products	8321/8270M	soil	normal	44	1	44	4	2	4		1	57	2
TOC	9060	sediment	normal	7	1	7						7	0
Grain Size	ASTM421/422	sediment	normal	7	1	7						7	0
Ranges Near Training Area T-24A Subtotal:						426	37	19	37	0	10	467	19

^aField duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.

Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Attn: John Reynolds
Tel: 423-588-6401
Fax: 423-584-4315

USACE Laboratory split samples are shipped to: U.S. Army Engineer District, Savannah
Environmental & Materials District
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Tel: 678-354-0310

MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
VOC - Volatile organic compound.

TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
ASTM- American Society for Testing and Materials

CWM Bkdn - chemical warfare material breakdown

packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.2.10 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP. Completed analysis request/COC records will be secured and included with each shipment of coolers to both laboratories.

The addresses are:

Quanterra-Knoxville
Attention: Sample Receiving
Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Telephone: (865) 588-6401.

QA split samples collected for the USACE laboratory will be shipped to the following address:

U.S. Army Engineer District, Savannah
Environmental & Materials Unit
Attn: Sample Receiving
200 North Cobb Parkway
Building 400, Suite 404
Marietta, Georgia 30062
Telephone: (678) 354-0310.

4.2.11 Investigation-Derived Waste Management

Management and disposal of the IDW will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW expected to be generated at the Ranges Near Training Area T-24A site will include drill cuttings, purge water from monitoring well development and sampling activities, decontamination fluids, and disposable personal protective equipment. The IDW will be staged within the fenced area surrounding Buildings 335 and 336 while awaiting characterization and final disposal.

4.2.12 Site-Specific Safety and Health

Safety and health requirements for the supplemental RI are provided in the SSHP attachment for the Ranges Near Training Area T-24A site. The SSHP attachment will be used in conjunction with the SHP.

5.0 Project Schedule

The project schedule for the supplemental RI activities will be provided by the IT project manager to the BRAC Cleanup Team and will be in accordance with the WP.

6.0 References

American Society for Testing and Materials (ASTM), 1992, ***Method D 1586-84, Method for Penetration Test and Split-Barrel Sampling of Soils***, Reapproved.

American Society for Testing and Materials (ASTM), 1993, ***Method D 2488-93, Practice for Description and Identification of Soils*** (Visual-Manual Method).

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Environmental Science and Engineering Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Environmental Science and Engineering Inc. (ESE), 1984, ***Reassessment of Fort McClellan, Alabama***, May.

Fort McClellan (FTMC), 1997, ***Fort McClellan Comprehensive Reuse Plan***, prepared under contract to the Calhoun County Commission, November.

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

Abs	skin absorption	COE	Corps of Engineers	FMP 1300	Former Motor Pool 1300 Site
AC	hydrogen cyanide	Con	skin or eye contact	Frtn	fraction
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	CRL	certified reporting limit	FS	field split
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	CRZ	contamination reduction zone	ft	feet
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	CS	ortho-chlorobenzylidene-malononitrile	ft/ft	feet per foot
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	CSEM	conceptual site exposure model	FTA	fire training area
ACGIH	American Conference of Governmental Industrial Hygienists	ctr.	container	FTMC	Fort McClellan
ADEM	Alabama Department of Environmental Management	CWA	chemical warfare agent	g	gram
AEL	airborne exposure limit	CWM	chemical warfare materials, clear wide mouth	G-856	Geometrics, Inc. G-856 magnetometer
AL	Alabama	CX	dichloroformoxime	G-858G	Geometrics, Inc. G-858G magnetic gradiometer
amb.	Amber	D	duplicate	gal	gallon
ANAD	Anniston Army Depot	DANC	decontamination agent, non-corrosive	gal/min	gallons per minute
APT	armor piercing tracer	°C	degrees Celsius	GB	sarin
ASP	Ammunition Supply Point	°F	degrees Fahrenheit	gc	clay gravels; gravel-sand-clay mixtures
ASR	Archives Search Report, July 1999	DDT	dichlorodiphenyltrichloroethane	GC	gas chromatograph
AST	aboveground storage tank	DEP	depositional soil	GC/MS	gas chromatograph/mass spectrometer
ASTM	American Society for Testing and Materials	DI	deionized	GFAA	graphite furnace atomic absorption
B	analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	DIMP	di-isopropylmethylphosphonate	gm	silty gravels; gravel-sand-silt mixtures
BCT	BRAC Cleanup Team	DMMP	dimethylmethylphosphonate	gp	poorly graded gravels; gravel-sand mixtures
BFB	bromofluorobenzene	DOD	U.S. Department of Defense	gpm	gallons per minute
bgs	below ground surface	DP	direct-push	GPR	ground-penetrating radar
bkg	background	DPDO	Defense Property Disposal Office	GPS	global positioning system
bls	below land surface	DQO	data quality objective	GS	ground scar
BOD	biological oxygen demand	DRMO	Defense Reutilization and Marketing Office	GSBP	Ground Scar Boiler Plant
BRAC	Base Realignment and Closure	DS	deep (subsurface) soil	GSSI	Geophysical Survey Systems, Inc.
Braun	Braun Intertec Corporation	DS2	Decontamination Solution Number 2	GST	ground stain
BTEX	benzene, toluene, ethylbenzene, and xylenes	E&E	Ecology and Environment, Inc.	GW	groundwater
BTOC	below top of casing	EBS	environmental baseline survey	gw	well-graded gravels; gravel-sand mixtures
BZ	breathing zone; 3-quinuclidinyl benzilate	Elev.	elevation	HA	hand auger
C	ceiling limit value	EM	electromagnetic	HCl	hydrochloric acid
Ca	carcinogen	EM31	Geonics Limited EM31 Terrain Conductivity Meter	HD	distilled mustard
CCAL	continuing calibration	EM61	Geonics Limited EM61 High-Resolution Metal Detector	HDPE	high-density polyethylene
CCB	continuing calibration blank	EOD	explosive and ordnance disposal	Herb.	herbicides
CD	compact disc	EODT	explosive and ordnance disposal team	HNO ₃	nitric acid
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	EPA	U.S. Environmental Protection Agency	hr	hour
CERFA	Community Environmental Response Facilitation Act	EPC	exposure point concentration	H&S	health and safety
CESAS	Corps of Engineers South Atlantic Savannah	EPIC	Environmental Photographic Interpretation Center	HSA	hollow stem auger
CFC	chlorofluorocarbon	ER	equipment rinsate	HTRW	hazardous, toxic, and radioactive waste
CG	cyanogen chloride	ESE	Environmental Science and Engineering, Inc.	I	out of control, data rejected due to low recovery
ch	inorganic clays of high plasticity	ESV	ecological screening value	ICAL	initial calibration
CK	carbonyl chloride	E-W	east to west	ICB	initial calibration blank
cl	inorganic clays of low to medium plasticity	EZ	exclusion zone	ICP	inductively-coupled plasma
Cl.	chlorinated	FB	field blank	ICS	interference check sample
CLP	Contract Laboratory Program	FD	field duplicate	ID	inside diameter
CN	chloroacetophenone	FedEx	Federal Express, Inc.	IDL	instrument detection limit
CNB	chloroacetophenone, benzene, and carbon tetrachloride	FPE	field flame expedient	IDLH	immediately dangerous to life or health
CNS	chloroacetophenone, chloropicrin, and chloroform	Fil	filtered	IDW	investigation-derived waste
COC	chain of custody	Filt	filtered	IMPA	isopropylmethyl phosphonic acid

List of Abbreviations and Acronyms (Continued)

in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
IT	IT Corporation
ITEMS	IT Environmental Management System TM
J	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC ₅₀	lethal concentration for 50 percent of population tested
LD ₅₀	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LT	less than the certified reporting limit
max	maximum
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m ³	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	milliSiemens per centimeter
MSD	matrix spike duplicate
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes, severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available

NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	not detected
NE	no evidence
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NR	not requested
ns	nanosecond
N-S	north to south
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control

QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.
qty	quantity
Qual	qualifier
R	rejected
RCRA	Resource Conservation and Recovery Act
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
sm	silty sands; sand-silt mixtures
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System [®]
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound

List of Abbreviations and Acronyms (Continued)

SW	surface water
SW-846	U.S. EPA <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compounds
TLV	threshold limit value
TN	Tennessee
TOC	top of casing, total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
UJ	not detected above reporting limit; result should be estimated
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USAMCLS	U.S. Army Chemical School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validated qualifier
VX	nerve agent (O-ethyl-S- [diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd ³	cubic yards

ATTACHMENT 2

RESPONSE TO COMMENTS

**SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN AND
SITE-SPECIFIC SAFETY AND HEALTH PLAN ATTACHMENTS
AT THE RANGES NEAR TRAINING AREA T-24,
PARCELS 187(7), 112Q, 113Q-X, 213Q, AND 214Q
FORT MCCLELLAN, ALABAMA
RESPONSE TO COMMENTS BY ADEM**

General Comments

Comment: ADEM is encouraged that IT Corporation will be using new slow-purge techniques for collecting groundwater samples for unfiltered metals. ADEM is aware that the new techniques are not addressed in this sampling plan or in Section 4.9.1.4 of the SAP at this time. However, turbidity is still a concern to the Department and measures should be implemented to minimize and stabilize turbidity at low levels. It is apparent that many of the existing wells that were sampled near Training Area T-24A had high turbidity, which resulted in elevated concentrations of metals. ADEM understands that these wells will be resampled as part of the Supplemental Remedial Investigation. Obtaining low turbidity is important in this resampling event.

Response: Comment noted.

Specific Comments

Comment 1: Cover Page: Remove the extra "Parcel" on the Cover Page.

Response: The title will be revised.

Comment 2: Page ii: List of Figures should be "Page vi"; List of Appendices should be "Page vii"; List of Acronyms should be "Page viii".

Response: The table numbers will be revised as necessary.

Comment 3: Page vii/List of Appendices: Appendix C does not contain the "UXO Work Plan". Appendix C contains the Health and Safety Plan.

Response: The list will be revised. The UXO safety plan will be added to the final revision.

Comment 4: Page viii/Acronyms: The acronym list is incomplete and some of the acronyms are not defined in the text. Please add the following acronyms to the “List of Acronyms”:

TRADOC	TOC	M11	SDZ	GS	MM
SL	GST	Bkg	REG	FD	FS
PQ	MS/MSD	ug/l	mg/l	ND	N/A
bgs	NAD83	TOC			

Response: A complete list of all acronyms used in IT documents will be provided in the back of each document as a foldout 11”x17” insert. This will provide a readily available acronym list for the reader.

Comment 5: Page ES-2: Line 30: Delete “for the”.

Response: The text will be revised as noted.

Comment 6: Page ES-3/: Line 7: Define “IWWP”.

Response: The first use of the acronym IWWP will be defined where used.

Comment 7: Figure 1-1: Figure 1-1 does not give a general location of Ft. McClellan in reference to its location in Alabama. A map location of Ft. McClellan geographically in the State of Alabama would help. Figure 1-1 shows the Ft. McClellan boundaries but does not say that the area is Ft. McClellan. Please add “Ft. McClellan” and other features to the Map. Figure 1-1 does not show the location of Parcel 187(7). Add the location of Parcel 187(7).

Response: IT does not feel that a general location map of Fort McClellan within Alabama is required. Parcel 187(7) is Training Area T-24A, which is shown on the figure. Figure 1-1 will be revised to clarify this situation. Figure 1-1 will also be revised to address all other comments.

Comment 8: Page 1-2/Section 1.2/Lines 2-3: The features described in the first sentence are not shown in Figure 1-1. Please clarify.

Response: The reference to Figure 1-1 is misplaced. The reference to Figure 1-1 will be revised.

Comment 9: Page 1-4/Section 1.3.1/Lines 13-14: The sentence references Parcel 187(7) to Figure 1-2 but is not shown on the figure. Please show Parcel 187(7) on Figure 1-2.

Response: Parcel 187(7) is Training Area T-24A, the Former Chemical Munitions Disposal Area which is shown on the figure. Figure 1-2 will be revised to clarify this situation.

Comment 10: **Figure 1-2: See Specific Comment No. 9.**

Response: Parcel 187(7) is Training Area T-24A, which is shown on the figure. Figure 1-2 will be revised to clarify this situation.

Comment 11: **Table 1-1: Table 1-1 needs to be placed after page 1-6.**

Response: Table 1-1 will be placed behind page 1-6.

Comment 12: **Page 1-17/Section 1.5/Lines 9-10: Parcel 187(7) is not depicted on Figure 1-9. Please show Parcel 187(7) on Figure 1-9.**

Response: Figure 1-9 will be revised with the location of Parcel 187(7).

Comment 13: **Figure 1-9: Show Training Area T-24 and Parcel 187(7) on Figure 1-9. The “Roads” noted in the Legend indicate that the roads are black, however the roads in the figure are pink. The “Fault Data Unavailable” is a different color. Please be consistent with the colors. Identify what “214Q, 113Q-X, etc. are in the Legend.**

Response: The figure will be revised in order to keep colors consistent and identify any of the necessary items shown in the figure.

Comment 14: **Figure 1-10: Please is consistent with the geologic symbols from the figure and boring logs. The insert figure showing the “Cross Section Location” needs a “Scale” and “North Arrow”.**

Response: A north arrow and scale will be added to the “Cross Section Location” insert in Figure 1-10.

Unfortunately, our IT system uses the descriptions presented in Figure 1-10. To incorporate this change, use geologic symbols from the figure that match the boring logs, IT believes, would incur costs that would not benefit the project.

Comment 15: **Figure 2-1: Please show Parcel 187(7) in Figure 2-1.**

Response: Parcel 187(7) is Training Area T-24A, which is shown on the figure. Figure 2-1 will be revised to clarify this situation.

Comment 16: **Figure 2-3: See Specific Comment No. 15.**

Response: Parcel 187(7) is Training Area T-24A, which is shown on the figure. Figure 2-3 will be revised to clarify this situation.

Comment 17: **Figure 2-4: See Specific Comment No. 15.**

Response: Parcel 187(7) is Training Area T-24A, which is shown on the figure. Figure 2-4 will be revised to clarify this situation.

Comment 18: **Page 2-8/Section 2.3.3/Lines 9-16: See General Comment No. 1.**

Response: Comment noted.

Comment 19: **Page 4-2/Section 4.2.1.1/Lines 23-26: Apparently this Supplemental Remedial Investigation did not propose any sample locations within the boundaries of Training Area T-24 (see Figure 4-1). There were soil and groundwater samples taken around the perimeter of Training Area T-24 but not within T-24's boundaries. At least two surface soil samples, one subsurface soil sample, and one groundwater sample need to be taken within the boundaries of the Training Area T-24.**

Response: Training Area T-24 is a CWM concern that will be addressed by Parsons Engineering as part of the CWM EE/CA (*Work Plan/Site Safety Submission, Volume 1 – Work Plan, Chemical Warfare Materiel Site EE/CA*, March 1999). Based on the conclusions of the EE/CA for T-24A, HTRW investigative activities may be completed, if warranted.

Comment 20: **Page 4-5/Section 4.2.3.2/Line 11: Delete “continuous wrap” and add “factory slotted”.**

Response: The well screen will be constructed of continuous wrapped PVC. PVC continuous wrap screen is constructed similar to steel continuous wrap screen. A thin ribbon of PVC wire (heated, semi-solid state) is wrapped around a circular array of longitudinal PVC rods. The wire is attached by a heat weld producing a one-piece unit.

Comment 21: **Page 4-5/Section 4.2.3.2/Line 15: A bentonite seal should be placed above the filter pack. Please clarify.**

Response: A two foot bentonite seal will be installed prior to the placing of grout. The text will be revised to reflect this.

Comment 22: **Page 4-6/Section 4.2.3.3/Lines 27-31: A 12-inch borehole and a 10-inch ID carbon steel casing does not give a 2-inch annular space between the outer casing and borehole wall. This type of installation results in a 1-inch**

annular space. An 8-inch ID carbon steel casing installation in the 12-inch borehole results in a 2-inch annular space which then would result in a 2-inch annular space between the 8-inch carbon steel outer casing and the 4-inch ID, PVC well casing. Please clarify the text.

Response: The text will be revised to reflect the use of 8-inch carbon steel outer casing.

Comment 23: **Page 4-7/Section 4.2.3.3/Line 11: Delete “continuous wrap” and add “factory slotted”.**

Response: The well screen will be constructed of continuous wrapped PVC. PVC continuous wrap screen is constructed similar to steel continuous wrap screen. A thin ribbon of PVC wire (heated, semi-solid state) is wrapped around a circular array of longitudinal PVC rods. The wire is attached by a heat weld producing a one-piece unit.

Comment 24: **Page 4-7/Section 4.2.3.3: A bentonite seal should be placed above the filter pack. Please clarify.**

Response: A two foot bentonite seal will be installed prior to the placing of grout. The text will be revised to reflect this.

Comment 25: **Page 4-8/Section 4.2.5.1/Line 20: Surface water sampling rational is not listed in Table 4-1. Please add the surface water sampling rational to Table 4-1.**

Response: The table will be revised.

Comment 26: **Page 4-9/Section 4.2.6.1/Line 7: Sediment sampling rational is not listed in Table 4-1. Please add the surface water sampling rational to Table 4-1.**

Response: The table will be revised.

Comment 27: **Appendix A/HTRW DRILLING LOG FTA-108-GP01: Please identify the following: “X”, “CL/OP”, and “EXP”. Please give units to “Surface elevation”, “Overburden thickness”, “Depth drilled into bedrock”, and “Total depth of hole”. All Logs need to be signed under “Signature of inspector”. Please correct all proceeding logs.**

Response: A complete list of all acronyms used in IT documents will be provided in the back of each document as a foldout 11”x17” insert. This will provide a readily available acronym list for the reader.
The logs will be revised to include units for “Surface elevation”, “Overburden thickness”, “Depth drilled into bedrock”, and “Total depth of hole”. An entry

will be added for and the name of the inspector. The entry of "Signature of inspector" will be removed.

HTRW DRILLING LOG FTA-108-GP02: Round off surface elevations at least to the nearest 0.01-foot or most to the nearest 0.10-foot. Please correct all logs.

Response: The instrumentation used to obtain the surface elevation is capable of readings to the 0.01 foot. Elevations will be rounded off to the nearest 0.01 foot.

HTRW DRILLING LOG FTA-108-GP03: Please correct the "Hole location" and the "Location". Change on Sheet 4 of 4 "Bottom of borehole is 24'" to "24' or (24-ft)".

Response: The log will be revised.

HTRW DRILLING LOG FTA-108-GP07: Did it take 12 days to drill this boring or to complete the well? This is a drilling log and the completion to drill the boring should be considered not the installation of the well. The well completion report is for well completion dates. Please clarify this on all borings.

Response: These drilling logs are created to record the information obtained from the activities completed at a particular location, in this case, FTA-108-GP07. It required 12 days to complete the data collection of this location as specified on lines 10 and 11 September 13, 1999 to September 24, 1999.

HTRW DRILLING LOG FTA-88-GP01: Sheet 2 of 3 at 4-feet below ground surface shows incomplete blow counts (Rec 6"/24" Blow 17 26 ??). Please clarify.

Response: The information will be reviewed and the log will be revised.

Comment 28: Appendix A/Monitoring Well Installation Detail FTA-88-GP01: Please fill in the "Approximate Diameter of Borehole" and "Bottom of Borehole".

Response: The log for FTA-88-GP01 will be revised.

Monitoring Well Installation Detail FTA-88-GP04: Please round off the "Ground Surface Elevation" and "Top of Well Casing or Riser Pipe Elevation" to the nearest 0.01-foot. Please clarify this on all Monitoring Well Installation Detail forms. Apparently there are some wells that have a "Stickup". Please fill in all appropriate blanks.

Response: The Monitoring Well Installation Detail logs will be revised as requested.

Comment 29: Appendix A/Soil Boring/Well Log BK-G06: The “Well Const. As-Built” figure shows the 4” Schedule 40 PVC Riser” to the top of the Sand Filter Pack. The 4” Schedule 40 PVC Riser needs to be extended to the top of the screen. Please clarify.

Response: The “Soil Boring/Well Log” was copied directly from the RI Report completed by SAIC in 2000. IT has no way of revising the form. The form will be used in its present condition.

Comment 30: Appendix C/ See Specific Comment No. 3.

Response: The document will be revised with a UXO Safety Plan.

DRAFT SUPPLEMENTAL REMEDIAL INVESTIGATION SITE-SPECIFIC AND HEALTH PLAN ATTACHMENT

General Comments

No General Comments noted.

Specific Comments

Comment 1: Page iii/Acronyms: The Acronym List is incomplete. Please add and define appropriate acronyms.

Response: A complete list of all acronyms used in IT documents will be provided in the back of each document as a foldout 11”x17” insert. This will provide a readily available acronym list for the reader.

Comment 2: Page 8/Section 5.0/Line 14-15: Please add explicit detailed directions from the Training Area T-24, Parcels 187(7), 112Q, 113Q-X, 213Q, and 214Q to the hospital. Give the physical address and appropriate phone numbers in Section 5.0.

Response: Driving directions to the hospital will begin from the entrance to Main Post, and not from the parcel and are included on Figure 1-2. The address of the hospital will be included on Figure 1-2. The Fort McClellan Project Emergency Contacts are listed in the front of the Site-Specific Safety And Health Plan Attachment.

Comment 3: Figure 1-2: The figure is presented as “Figure 1”. Change the figure name to Figure 1-2. Training Area T-24 is marked on the map but the road details are very limited. Please produce a Hospital Emergency Route Map that shows appropriate details, directions, addresses, and phone numbers.

Response:

The figure will be revised with the appropriate figure number.

Driving directions to the hospital will begin from the entrance to Main Post, and not from the parcel. The address of the hospital will be included on Figure 1-2. The Fort McClellan Project Emergency Contacts are listed in the front of the Site-Specific Safety And Health Plan Attachment.

**SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN AND
SITE-SPECIFIC SAFETY AND HEALTH PLAN ATTACHMENTS
AT THE RANGES NEAR TRAINING AREA T-24,
PARCELS 187(7), 112Q, 113Q-X, 213Q, AND 214Q
FORT MCCLELLAN, ALABAMA
RESPONSE TO COMMENTS BY
ENVIRONMENTAL PROTECTION AGENCY REGION 4**

OVERALL TECHNICAL COMMENTS

Comment: **The Draft SFSP is well organized and written from an overall technical viewpoint. However the following comments should be addressed before the document is finalized.**

Response: **Comment noted.**

RISK ASSESSMENT COMMENTS

General Comments

Comment 1: **The aerial photography interpretation mentions pits and depicts two pits on Figures 1-7 and 1-8. Line 6 on Page 1-13 identifies a possible liquid filled pit observed in a 1972 aerial photograph. Line 16 on Page 1-4 specifies that there were “two square burning pits, each measuring approximately 16 by 16 feet”. Page 1-4 should indicate whether the location of these burning pits is known. Also, the locations of the former burning pits should be depicted on figures presenting proposed sampling locations.**

Response: **Agree. The location of the pits is unknown, however, (SAIC, 1999) indicate that four anomalies exist, based on the geophysical investigations. These anomalies are referred to as potential pit locations. The text will be revised to reflect this information. Figures will be revised to show the approximate locations of the anomalies.**

Comment 2: **A minimum of three sediment and surface water samples should be collected from the creek segment within parcel 113Q-X which is between Training area T-24A and Parcel 213Q. These samples are needed because of the relatively close proximity of the creek to the former burning pits and the creek segment is within the former demolition area. The groundwater flow direction and the topographic relief indicate the possibility of contaminant migration pathways from the T-24A area to the creek. Also the creek is downhill from Parcel 213Q. No sediment or surface water samples are currently proposed. It does not appear from Figure 2-1, 2-2, and 4-1 as if sediment and surface water samples were**

collected from this creek segment during an SI or prior investigation. However data reported in Table 2-2 specifies that surface water sample T24A-W02 had 8.82 ug/L of lead detected; therefore prior sampling must have occurred in this stream segment. Additional sediment and surface water data need to be collected with results compared to ecological screening values. Additionally, field duplicate, and MS/MSD samples should be collected for surface water and sediment samples. These QA/QC samples should be presented on Table 4-4.

Response: The criteria of three sediment/surface water samples for this RI event will be satisfied for the surface water feature present at this location. Appropriate QA/QC samples will be collected as necessary. Figures 3-1 and 4-1 and Tables 3-1, 4-1, 4-4 and 4-5 will be updated with these samples.

Comment 3: It does not appear as if lead was analyzed in the prior surface water samples. Tables 2-10 and 2-11 do not present lead. Since previous firing ranges are within the parcels being evaluated in this work plan, a footnote should specify if lead was analyzed but was not detected.

Response: Agree. The tables will be modified with a footnote referencing the reader to Appendix B for a comprehensive list of all analytes that were analyzed for, including lead.

**SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN AND
SITE-SPECIFIC SAFETY AND HEALTH PLAN ATTACHMENTS
AT THE RANGES NEAR TRAINING AREA T-24,
PARCELS 187(7), 112Q, 113Q-X, 213Q, AND 214Q
FORT MCCLELLAN, ALABAMA
RESPONSE TO COMMENTS BY U.S. ARMY CORPS OF ENGINEERS,
MOBILE DISTRICT**

Comment 1: **Page ES-2/Typos:** Delete “be” after “will” in line 20. Insert “be” after “will” in line 24. Delete “for” in line 28. Delete “for the” in line 30.

Response: These revisions will be made.

Comment 2: **Page 1-2/Line 3:** This sentence references Fort McClellan in relation to the cities of Anniston and Weaver; however, they are not depicted on Figure 1-1.

Response: The reference to Figure 1-1 is misplaced. The reference to Figure 1-1 will be revised.

Comment 3: **Figure 1-11:** The note in the legend says that FTA-108-T24A-G01 groundwater elevation was not used in developing the contour map. An explanation of why it was not used should be added to the discussion Page 1-19.

Response: The text will be revised with this explanation.

Comment 4: **Page 2-1/last paragraph:** This section should be revised to include the history of the Chemical Warfare Material activities at the site.

Response: The text will be revised to include the history of the CWM activities at this site.

Comment 5: **Page 2-4:** Remove ‘draft’ in the references to the SSSLs and from the title of the Screening Values and PAH summary report.

Response: Agree. The text will be revised.

Comment 6: **Page 3-3/Lines 24 and 29:** Table 3-1 is missing.

Response: Table 3-1 will be added to the Final report.

Comment 7: **Page 4-1/Line 21:** The UXO Work Plan is not included in Appendix C as indicated here.

Response: The UXO Work Plan will be added to the Final report..

Comment 8: **Table 4-5: Should the number of sample points for soil be 41 rather than 37 (27 surface, 8 subsurface, and 4 sediment)?**

Response: The table will be revised to reflect the correct number of soil samples.

DRAFT SUPPLIMENTAL REMEDIAL INVESTIGATION SITE-SPECIFIC AND HEALTH PLAN ATTACHMENT

Comment 1: **Page 1/Section 1.0/third and fourth bullets: The numbers of samples are incorrect in these bullets. There are 19 new wells (9 shallow and 10 deep), 29 surface soil samples, 8 subsurface soil samples, 37 monitoring well water samples (collected from 18 existing and 19 proposed monitoring wells), 4 surface water samples, and 4 sediment samples.**

Response: Agree. The text will be revised.

Comment 2: **Page 2/Line 19. Change (GG) to (GB).**

Response: Agree. The text will be revised.